



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



ERLANGMS: Implantação de um barramento de serviços no CPD/UnB

Universidade de Brasília

Centro de Informática

3 de Maio de 2017

Everton de Vargas Agilar
E-mail: evertonagilar@unb.br



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Plano

- ▶ Contexto
- ▶ Objetivos
- ▶ Justificativa
- ▶ Research Questions
- ▶ Search Strategy
- ▶ Results
- ▶ Conclusions/Future Works



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Contexto

Modernização de Sistemas Legados

“**Legacy information systems** are typically the backbone of an organization’s information flow and the main vehicle for consolidating business information. They are thus mission critical, and their failure can have a serious impact on business.” [BENNET95]

“Migrate Systems Incrementally recommends that the old system be gradually and incrementally replaced by the new system. New results can then be integrated as you proceed...” [DEMEYER et al. 2002]



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Contexto

Relatório de Gestão do CPD/UnB 2010-2012

“Foi identificada a necessidade de remodelação de todos os sistemas da UnB visando uma atualização tecnológica e uma melhor integração de seus fluxos.” ... [cpd.unb.br/transparencia]

- ▶ Alto custo de manutenção para manter os sistemas legados;
- ▶ Duplicação das regras de negócio entre os sistemas;
- ▶ Dificuldades para integrar os sistemas.



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Objetivos

- ▶ Propor uma abordagem para modernizar os sistemas legados de forma orientada a serviços (SOA) composto por:
 - ▶ barramento de serviços próprio desenvolvido em Erlang/OTP;
 - ▶ processo de modernização para guiar os trabalhos de modernização e disponibilizar uma arquitetura de software padronizada;
 - ▶ kit de desenvolvimento (SDK) para implementar serviços independente da linguagem de programação.



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Justificativa

- ▶ Permitir maior reuso dos fluxos de negócios e maximização da modularidade das aplicações;
- ▶ Experimentar SOA (Service Oriented Architecture);
- ▶ Obter uma arquitetura documentada e padronizada para modernização de software.



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Research Questions

Research Questions

- ▶ (QP1) What characterizes the modernization of legacy systems according to the existing literature?



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Research Questions

Research Questions

- ▶ (QP1) What characterizes the modernization of legacy systems according to the existing literature?
- ▶ (QP2) What processes, techniques, and tools have been suggested in the literature to support modernization activities of legacy systems?



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Research Questions

Research Questions

- ▶ (QP1) What characterizes the modernization of legacy systems according to the existing literature?
- ▶ (QP2) What processes, techniques, and tools have been suggested in the literature to support modernization activities of legacy systems?
- ▶ (QP3) What are the reasons that lead organizations to modernize their legacy systems?



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Search Strategy

- Analyzed 44 publications in major conferences and journals Engineering area Software (CMRS, ICSE, ICSM, among others);

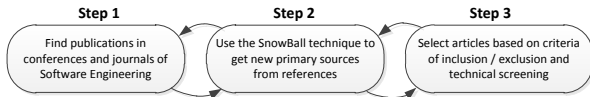


Figura: Scheme of the research protocol.



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Search Strategy

- Analyzed 44 publications in major conferences and journals Engineering area Software (CMRS, ICSE, ICSM, among others);
- The search strategy consists of a manual search activity for articles complemented by technical "snowball";

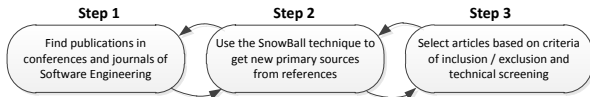


Figura: Scheme of the research protocol.



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Search Strategy

- ▶ Analyzed 44 publications in major conferences and journals Engineering area Software (CMRS, ICSE, ICSM, among others);
- ▶ The search strategy consists of a manual search activity for articles complemented by technical "snowball";
- ▶ Selected publications between 1995 and 2015.

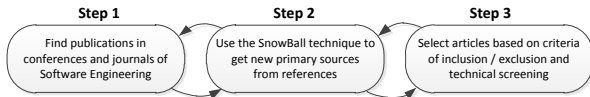


Figura: Scheme of the research protocol.

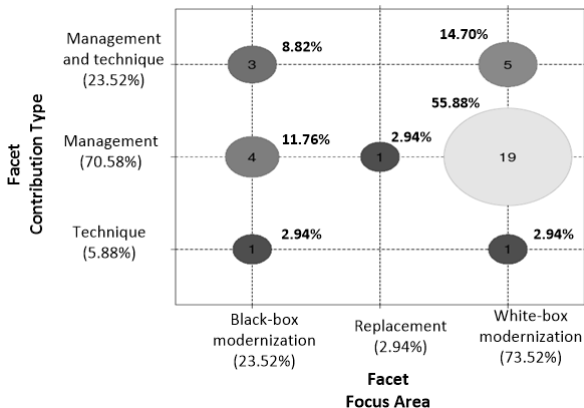


Universidade de Brasília - UnB



A Systematic Mapping Study on Legacy System Modernization

View of the studies identified





Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Terms most frequently cited in selected publications





Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Conclusions and Future Work

- ▶ We have presented the results of a mapping study (MS) that consolidates the main contributions to the field;
- ▶ We found that the majority of the publications relies on a kind white-box modernization approach;
- ▶ We also find that the managerial aspects are most relevant, which reinforces the idea of a good strategy of modernization;
- ▶ However, we found just a few studies reporting success experiences in modernizing legacy systems;
- ▶ As future work, we planned a service-oriented approach to modernizing legacy systems of UnB.



Universidade de Brasília - UnB

A Systematic Mapping Study on Legacy System Modernization



Questions and remarks ?